PB85-249522

Superfund Record of Decision (EPA Region 5)
Morris Arsenic Site, Morris, Minnesota
August 1985

(U.S.) Environmental Protection Agency
Washington, DC

7 Aug 85

U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-85/015
August 1985

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EPA

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NATIONAL TECHNICAL
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U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA
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1. REPORT NO. EPA/ROD/R05-85/015	2.
3. RECIPIENT'S ACCESSION NO. PB85 249522/AS	
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Morris Arsenic, MN	5. REPORT DATE August 7, 1985
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
	14. SPONSORING AGENCY CODE 800/00
15. SUPPLEMENTARY NOTES	

16. ABSTRACT

The Morris Arsenic site is located in Stevens County, approximately one mile northeast of Morris, Minnesota. In the early 1940s, approximately 1,500 pounds of arsenic-laced grasshopper bait was reportedly buried in a gravel pit near the intersection of Highways 28 and 59. The subsequent construction of the Highway 59 Bypass through the general location of the burial site has made the discovery of the exact burial location difficult. It has been presumed that the arsenic was mechanically dispersed during highway construction since top soil cleared from the site for road bed preparation was later spread along the side slopes.

The site poses no imminent health hazard to the public due to the direction of ground water movement from the site and the minimal population concentration within the site specific area. In addition, levels of arsenic found in the soils at the site are within the range of natural levels of arsenic in soil. Therefore, since the site poses no significant threat to public health, welfare or the environment, the "no-action" alternative was selected.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field Group
Record of Decision Morris Arsenic, MN Contaminated Media: soil Key contaminants: arsenic		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 11
	20 SECURITY CLASS (This page) None	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

Summary of Remedial Alternative Selection
Morris Arsenic Site
Morris, Minnesota

Site Location Description

The Morris Arsenic site is located in Stevens County about one (1) mile northeast of Morris, Minnesota. A copy of a site location map is attached (Figure 1).

In the early 1940s, approximately 1,500 lbs. of arsenic-laced grasshopper bait were reportedly buried in a gravel pit near the intersection of Highways 28 and 59 (See Figure 2). The subsequent construction of the Highway 59 Bypass through the general location of the burial site has made the discovery of the exact burial location difficult. It has been presumed that the arsenic was mechanically dispersed during highway construction since top soil cleared from the site for road bed preparation was later spread along the side slopes.

The primary health threat of concern is the potential for arsenic contamination of the shallow glacial aquifer. The unconsolidated glacial deposit of sand and gravel serve as the primary aquifer in the area. A home 600 feet northeast of the site, a furniture store 200 feet to the west, and several trailer homes as close as 300 feet to the southwest use this aquifer for drinking water. In addition, the Morris municipal well field, which draws water from the same shallow aquifer, is located 1 mile to the south.

The depth to ground water around the site is approximately 3-10 feet. Average linear ground water flow velocities range from 52 to 520 feet/year based on the hydraulic conductivity and porosity estimates. Under current hydraulic conditions, the ground water is discharging east toward the gravel pit pond and to the Pomme de Terre River.

Site History

During the 1930s and early 1940s, grasshoppers were a devastating crop pest in many parts of the western and mid-western states including Minnesota. During that period, arsenic was used as a pesticide in an effort to control these grasshopper infestations. Various arsenic compounds were mixed with water, molasses, and wheat bran or sawdust to form a poisonous bait which was spread along edges of fields, in road ditches and along fence lines.

The grasshopper baiting program was managed, on a national level, by the United States Department of Agriculture (USDA). The arsenic was provided by the USDA. The State of Minnesota established mixing stations and provided storage areas for the arsenic bait. One of those mixing stations was located at the Stevens County fairgrounds in Morris, Minnesota (see Figure 1).

When the grasshopper plagues subsided and more effective pesticides (such as DDT) were developed, the arsenic baiting program was abandoned. A considerable amount of bait and arsenic compounds were left over.

The Morris Arsenic site history, including site investigations, has been summarized below:

1933-1934 — It has been reported that in 1933 or 1934 approximately 1,500 lbs. of surplus grasshopper bait (laced with arsenic) stored in burlap bags were moved by the county from the fairgrounds to an old state gravel pit just south of the intersection of Highways 28 and 59.

1940s (?) — According to reports, in the early 1940s twelve (12) cattle from a nearby farm strayed from their pasture and apparently consumed the bait. Mr. Leo Lonergan, a highway department employee, found the dead cattle and the broken bags of bait. He immediately reported this incident to his supervisor and was instructed to bury the material. Mr. Lonergan has reported that he hauled three to four truck loads of soil over a fence (along the western edge of the pit) to cover the grasshopper bait. Mr. Lonergan has estimated that the arsenic wastes were buried 7-8 feet below the surrounding land surface.

1978-1979 — During this period, the Highway 59 Bypass was constructed through the area now suspected to be the burial site. The Minnesota Department of Transportation (DOT) and the construction crews were apparently unaware that the arsenic wastes might have been buried in the area.

July 1980 — Mr. Lonergan identified the site to the Stevens County sheriff, who in turn notified the Minnesota Pollution Control Agency (MPCA).

October 1980 — The MPCA staff attempted to locate the arsenic in an area identified by Mr. Lonergan. Twenty (20) test holes were drilled in an area near the present location of Monitoring Well No. B-10 (see Figure 2). Visual observations and chemical analysis of two (2) soil samples did not reveal arsenic contamination. Re-evaluation of the site location by Mr. Lonergan indicated the site to be farther south of his original estimate.

1981-1982 — An EPA Field Investigation Team (FIT) conducted a preliminary soils and hydrogeologic investigation at the Morris Arsenic site. Twelve (12) monitoring wells were installed. A total of eleven (11) soil samples were obtained at depths of 3 to 3 1/2 feet and 8 to 8 1/2 feet and ground water samples were collected from the monitoring wells. Analysis of these samples for their arsenic content did reveal detectable amounts of arsenic present; however, the arsenic values in the soil were not outside the natural background ranges for west-central Minnesota and the arsenic values in the groundwater were high only because the proper technique to sample groundwater for inorganics prior to mid-1983 was to not field filter the sample.

May 1983	The Morris Arsenic site was scored by the EPA using the Hazardous Ranking System (HRS). The Morris Arsenic site received a score of 37.99.
August 1983	The Morris Arsenic site was placed on the National Priorities List (NPL).
November 1983	MPCA requested that a RI/FS be performed at the site.
March 1984	EPA initiates the RI at the site.
June-July 1984	EPA conducts on-site field activities for the RI at the site. The field activities included a geophysical survey drilling of 47 soil boring and collection of soil, groundwater, surface water and sediment samples.
April 1985	The RI report was finalized for the Morris Arsenic site. The EPA has performed quality assurance/quality control (QA/QC) reviews of the sample results and all data was found to be acceptable.

Current Site Status

The major findings of the remedial investigation are:

- An area of approximately 5,000 square feet along the western boundary of the former gravel pit has soil arsenic levels above the average natural background level (3 to 14 mg/kg) for soil in west-central Minnesota, but not outside the range of natural levels of arsenic in soil (0.1 mg/kg to 194 mg/kg)[1]. The zone of highest contamination is the first 4 to 5 feet below the water table. The maximum arsenic level found was 104 mg/kg between well B-1 and B-11 (See Figure 2). Five soil samples had arsenic levels from 50 to 68 mg/kg. All other soil samples had arsenic levels below 50 mg/kg. The elevated arsenic levels in the soils are similar to arsenic levels which are typically found in soils in the U.S.[2].

- Migration of arsenic in the groundwater does not appear to be presently occurring at the site. Analysis of monitoring well water samples found arsenic concentrations less than 8.2 ug/L with the highest concentration occurring at well B-3 (See Figure 2). Analysis of residential well water samples found arsenic concentrations less than 8.5 ug/L (1000 ug/L equals 1 mg/L or 1 ppm). Levels found in the groundwater were similar to the average natural background concentration (i.e., 3 ug/L). None of the arsenic levels in the groundwater are above the National Interim Drinking Water Standard for arsenic of 50 ug/L.

1 URE, A. M., ET. AL., "ELEMENTAL CONSTITUENTS OF SOILS" in ENVIRONMENTAL CHEMISTRY, VOL 2, pp 94-204, ed. H. J. M. BOWEN, ROYAL SOCIETY OF CHEMISTRY, BURLINGHOUSE, LONDON, U.K. 1983.

2 Lindsay, W.L., "CHEMICAL EQUILIBRIA IN SOILS", pp 7-8, John Wiley & Sons, 1979.

- Migration of arsenic via surface or air transport does not appear to be occurring at the site. Analysis of surface soil, surface water, and sediment samples did not find arsenic above the natural background concentration.

In summary, the remedial investigation found arsenic in the gravel pit soil in concentrations above average background levels, but did not find evidence of arsenic migration from that location. The elevated levels of arsenic in the soil do not present a hazard since they are buried and are not outside the range of arsenic found naturally occurring in soil.

Remedial actions to eliminate or palliate problems associated with this site are not justified at this time for the following reasons:

1) The site presently poses no imminent health hazard to the public due to the direction of ground water movement from the site and the minimal population concentration within the site specific area.

2) Despite the fact that the aquifer is being used for potable water purposes, domestic wells within the immediate vicinity of the site are generally upgradient from the source and are thus, not in a direct line path of any contamination that may emanate from the site.

3) Levels of arsenic found in the soils at the site are within the range of natural levels of arsenic in soil. The elevated arsenic levels in the soils are found at depths of 4 to 13 feet below the ground surface thereby minimizing exposure.

4) Levels of arsenic found in the groundwater are well below the National Interim Drinking Water Standard for arsenic of 50 ug/L.

Since the site poses no significant threat to public health, welfare or the environment, the "no-action" alternative was selected and the evaluation of other alternatives is unnecessary.

Community Relations

Public interest in the Superfund activities at the Morris Arsenic site has been low.

Copies of the RI report were made available to the community on April 23, 1985. A public meeting was held the evening of May 2, 1985 in the Morris Public Library to present the results of the RI and the deletion proposal. The public meeting was attended by seven (7) people including local officials and members of the press. The public and the MPCA staff briefly discussed the issue of placing zoning and building restrictions within the Morris Arsenic site area.

The reason for considering such restrictions was the potential that the process of withdrawing groundwater could draw arsenic from the soils to which it is adsorbed. The arsenic could concentrate in the area of nearby wells and thereby could cause levels of arsenic in groundwater withdrawn from these wells to rise.

The public comment period was from April 23, 1985 to May 14, 1985. The agency received no written comments from the public regarding the results of the RI or the proposed deletion during the 3-week public comment period.

Consistency with Other Environmental Laws

The proposed "no-action" alternative is consistent with other environmental laws. No federal standard exists for maximum arsenic concentration in soil. However, if the characteristic of extraction procedure (EP) toxicity exceeds 5 mg/L, contaminated soil would be considered a hazardous waste and remedial action, such as disposal would be performed according to the requirements of RCRA. The levels of arsenic in the soils never reached the levels necessary to conduct the EP toxicity test. Minnesota has established 500 mg/kg total arsenic as the level which a contaminated soil is considered a hazardous waste requiring proper disposal. The maximum arsenic level found in the soil at Morris Arsenic was 104 mg/kg. The maximum arsenic level found in groundwater samples at the site (8.5 ug/L) is below the National Interim Drinking Water Standard for arsenic of 50 ug/L.

Recommended Alternative

Section 300.68(j) of the National Oil and Hazardous Substances Contingency Plan states that EPA shall select the cost-effective alternative (i.e. the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment). EPA has determined that the "no-action" alternative for the Morris Arsenic site will achieve the above requirements. No other alternatives were evaluated.

Future Actions

MPCA is considering placing zoning and building restrictions within the Morris Arsenic site area as a deterrent to future development, thus preventing any endangerment to the public. The potential for future receptors of groundwater contaminated with arsenic was considered in the RI report. Placement of a well in the site area with subsequent usage could concentrate arsenic in the groundwater drawn from the well to hazardous levels. EPA concurs with the MPCA recommendation to place zoning and building restrictions at the site. However, the restrictions are being taken as a precautionary measure and are not considered a necessary remedial action.

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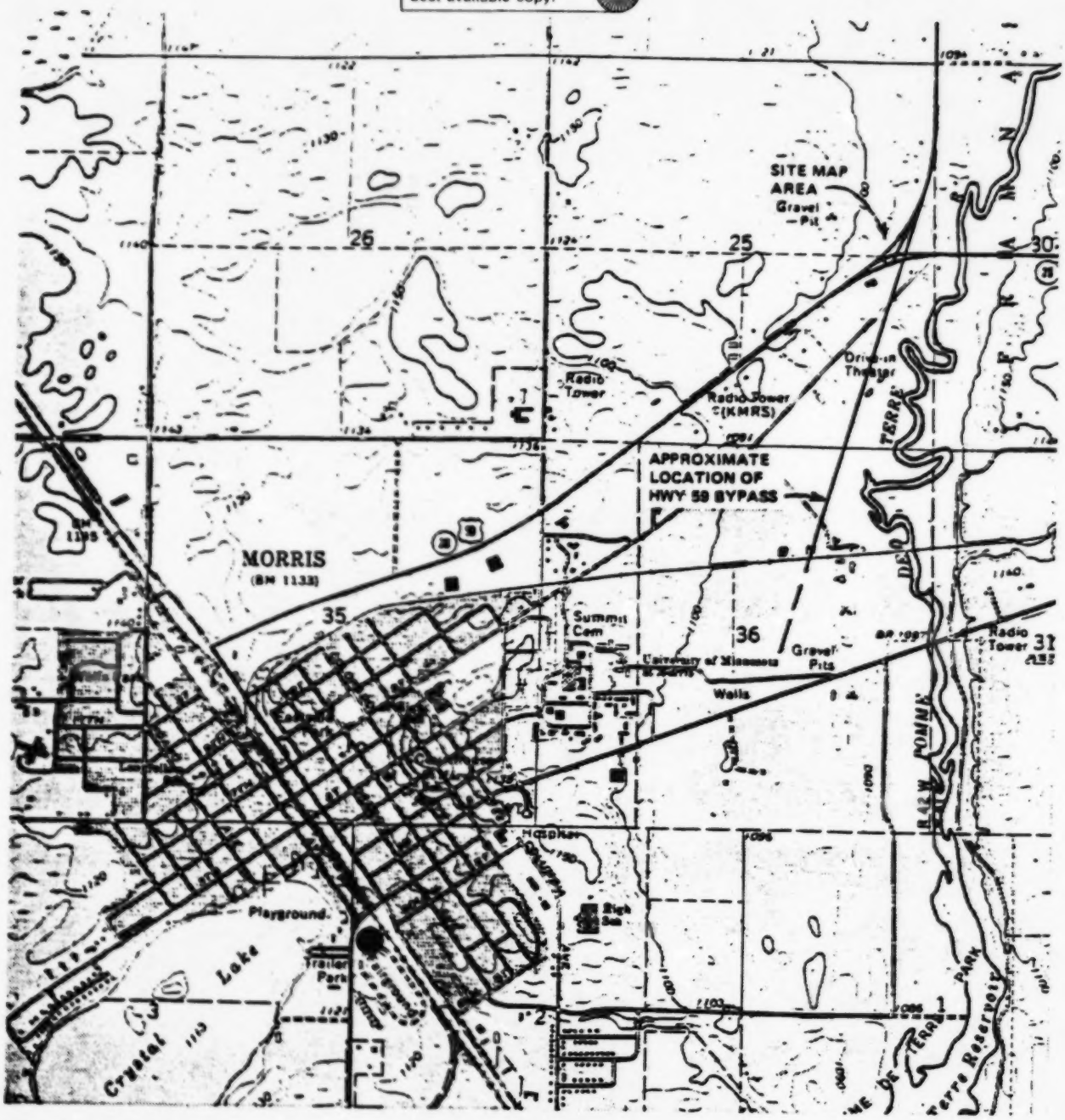

FIGURE 1
LOCATION MAP
MORRIS ARSENIC SITE

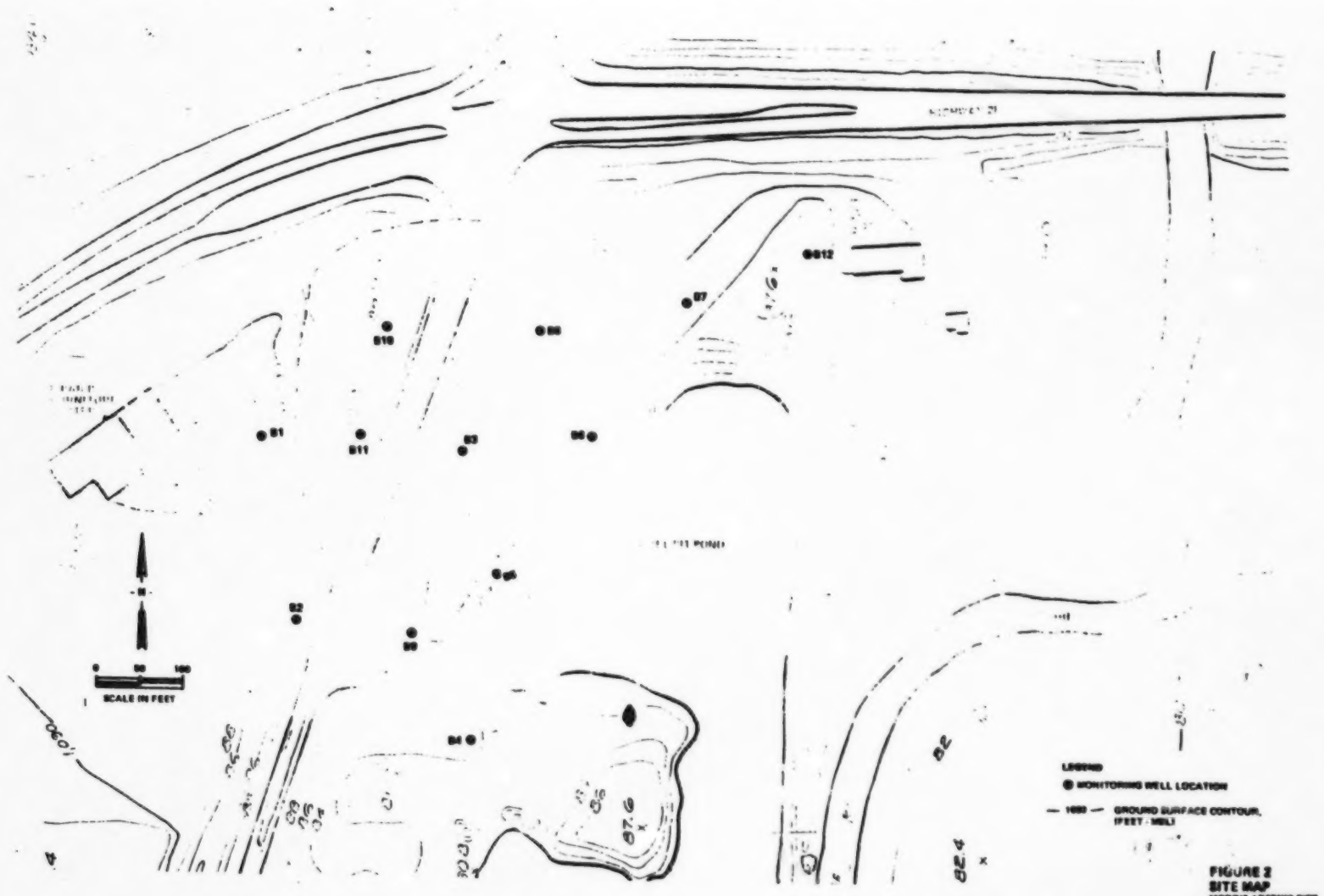

FIGURE 2
SITE MAP
MORRIS ARSENIC SITE

Community Relations Responsiveness Summary
Morris Arsenic Site
Morris, Minnesota

Introduction

This "Community Relations Responsiveness Summary" documents citizen reaction and concerns raised in reference to the remedial investigation (RI) and the proposed deletion from the National Priorities List (NPL) for the Morris Arsenic site in Morris, Minnesota. It also documents, for the public record, the United States Environmental Protection Agency's (U.S. EPA) response to the comments presented during the public comment period on the RI and the proposed deletion.

Concerns Raised During the Comment Period

The RI was completed on April 15, 1985. Copies of the RI report were made available to the community on April 23, 1985. The public comment period was from April 23, 1985 to May 14, 1985.

A public meeting was held the evening of May 2, 1985 in the Morris Public Library to present the results of the RI and the deletion proposal. The public meeting was attended by seven (7) people including local officials and members of the press.

The public and the MPCA staff briefly discussed the issue of placing zoning and building restrictions within the Morris Arsenic site area. Placement of a well in the site area with subsequent usage could concentrate arsenic in the groundwater drawn from the well to hazardous levels. Zoning and building restrictions would preclude the placement of wells within the site area. EPA concurs with the MPCA recommendation to place zoning and building restrictions at the site.

The agency received no comments from the public regarding the results of the RI or the proposed deletion during the 3-week public comment period.